Journal of Education and Practice
ISSN 2222-1735 (Paper) ISSN 2222-288X (Online)
Vol.6, No.29, 2015
www.iiste.org

Teaching Aids a Special Pedagogy Tool of Brain Development in School Children, Interest and Academic Achievement to Enhance Future Technology

OHWOJERO CHAMBERLAIN JOSEPH
(Ph.D. Student, University of Nigeria, Nsukka)
DELTA STATE UNIVERSITY SECONDARY SCHOOL
PMB 1 ABRAKA,DELTA STATE,NIGERIA,WEST AFRICA

Abstract
The school system is an institution where teachers adopt different teaching methods to impact knowledge and skills. The teaching method adopted by a class teacher has a great effect on children interest, academic achievement and brain development of a child. To support this fact the researcher used two groups of children from ten schools to carry out a study. Five schools where used as control groups while another five schools was used as experimental groups. Both groups have a population of 400 pupils in the ten schools that were selected for the study. In carrying out this research, two research questions were raised to guide the study; with two hypotheses formulated and tested at 0.05 significantlevels. Findings were discussed based on observations and recommendations were made to guide the class teachers, parents, government and children on the importance of teaching aids in the teaching and learning of child development.
Keywords: The role of a teacher, Interest, and brain development.

1.0 Introduction

Teachers are great facilitators and prime mover of knowledge and skills in the teaching and learning profession in this 21st century. The function of the teacher in the classroom can be equated to the function of a propellant that exhibits a driving force that is capable of pressurizing water flow in a system. The force that illuminate from the teacher to the learner during teaching and learning process is like a magnetic force that attracts metallic objects. The power of a teacher in the school system depends on some salient variables like teaching aids, teaching methods and environment that enables a teacher to impart good knowledge to a child. A teacher can facilitate the mind of a child as learner with the help of teaching aids as a pedagogy tool during teaching and learning process irrespective of age. Leonidas, (2015) observed that toys and objects help to stimulate and develop the brain of a child during learning process. The term facilitator is used to qualify the role of a teacher in the classroom. Many authors described a teacher as facilitator in the teaching profession as a person who is democratic (Harmer, 2007).

The role of a teacher as a facilitator in the school system is termed assistance a teacher gives to the learner to be able to apply concepts in Mathematics, English and science through classroom instruction and presentation (Cox, 2015). When a teacher is able to demonstrate the use of teaching aids during teaching process in the classroom to motivate children interest, it equips a child to develop a great enthusiasm and wiliness to learn more and become attentive in the class to understand what has been taught in the classroom to develop the brain of a child and interest that will lead to good academic achievement. It is then one can ascertain that the teacher has adopted good teaching technique to motivate a child interest. The positive early experience of a child forms the foundation for early lifelong learning and behaviour of the child. It also helps to optimize the fast development of each child in the school system. A rich nurturing environment is required for a child development (Diamond and Hoppson, 1998; Fischer and Rose, 1998).

The elementary school stage of a child depends on the attracting force that illuminate from the teacher as the centre focus of attention when teaching aids are used during teaching process. The teacher in the classroom setting perform different roles when making decisions about the planning and teaching of lessons in the classroom to revolutionize teaching and learning in the school system (Vebra, 2015). To support this statement Douglas, (2007) states that teachers can play so many roles in the teaching and learning process in the school system. The role of a teacher can have influence on children interest and level of academic achievement to improve their knowledge and skills which will help to enhance future technology. Technological development in children depend on good teaching techniques of using teaching aids by the class teacher to motivate a child interest to develop their knowledge and skills towards future technology. The ability of a teacher to carry out teaching process very effectively also depends on the extent of close relationship a teacher establishes with the children in the school system using teaching aids to motivate their interest. Lanier, (1997) observed that one of the most challenging responsibility of the teacher in the teaching profession is the searching and construct of meaningful educational experience that will assist children to solve word problems to show that they have learnt big ideas, powerful skills, and habits of mind and heart that will agree and meet educational standard.

The study of brain development in children in this study is anchored on the theory of constructivism that says learning in children can be developed based on the principle of thinking. Children learn through adaptation, but not passive in knowledge but active at making meaningful testing senses out of theories and try to make sense out of the world themselves. The constructivism theory is based on the philosophy experiences that we construct on our own understanding of the world we live in. To support the constructivism theoryMcleold, (2009) published Jean Piaget work on theory of development that says a developing child build cognitive structure like mental maps, schema and network concepts for understanding and responding to physical experience within his or her environment. Jean Piaget further attest that a child's cognitive structure increases in sophistication with development that move from a few innate reflex such as crying and sucking to highly complex mental activities .At the elementary school stage of a child, it is very pertinent to note that a teacher should have a good relationship with the children through the use of teaching aids as technological tool that should be used to enhance children interest in the classroom. Children interest in the classroom can be motivated when class teacher interact with the learners using teaching aids as demonstrated by Britto, (2014) in figure 1 shown below.

fig 1: Britto, (2014) How Children brain develop- new insight

An interactive teacher is that teacher who is fully aware of the dynamics of a classroom, Dornye and Murphy, (2003) explained the success of classroom learning as the extent of how much learners can depend on the relationship that exists between them and the teacher. Teaching aids as a pedagogy tool of teaching has helped in the dissemination of information by the teacher to the children in the classroom. Sahakov, (2014) states that just a decade ago school teachers used chalkboard, and then progressed to whiteboards and now they are using smart boards. Smart boards are advanced teaching boards that allows the teacher to teach and share information with learners in a multiplicity of ways. To support this statement Edison,(1913) predicted that books will soon be obsolete in the public schools and schools will be completely changed in the future. Dunn, (2011) outlined and demonstrated the evolution of classroom technology from 1650 when horn books were used in the teaching and learning process to 2010 when Apple/I-pad were developed to facilitate teaching and learning in the school system.

The use of teaching aids as technology pedagogy tool in the classroom setting has greatly improved the interest of the learners, most especially children at the elementary school level. Teaching aids like computers, audio-visual aids, power point presentation and other animated software are now being used to present information by the teacher in form of interactive manner at the elementary school level which has helped to motivate a child interest and brain development. The assimilation and retention of a child at the elementary school stage depends on the brain development of a child and the type of teaching aids that is used by the teacher in the classroom. Krueger, (2005) states that the brain development of a child also depend on the type of food a child is given, food that contain all the nutrients that is required for the growth and brain development of a child, food like eggs, Greek yogurt, greens, fish, nuts and seeds, oats meal and apples and plums should be given to children. According to him, these foods items are very vital supplements for the child brain development. Jeppson and Myers, (2006) assert that when babies are born their brain is very ready to learn, based on this observation new born babies can understand certain things about objects and their relationship to each other. The brain organizes what the child experiences into group in the memory, hence children are given the chance to touch, taste, see, hear and smell to enable the children develops their knowledge. At the elementary school, children are thought with objects as teaching aids to enable children develop their interest, imagination and able

to recall what has being retained in the brain.Pevzner, (2015) prepared an age by age guide to child mental development. The developmental brain of a child is in stages depending on the growth of a child and the environmental exposure of the child as demonstrated in the cyclic diagram below.

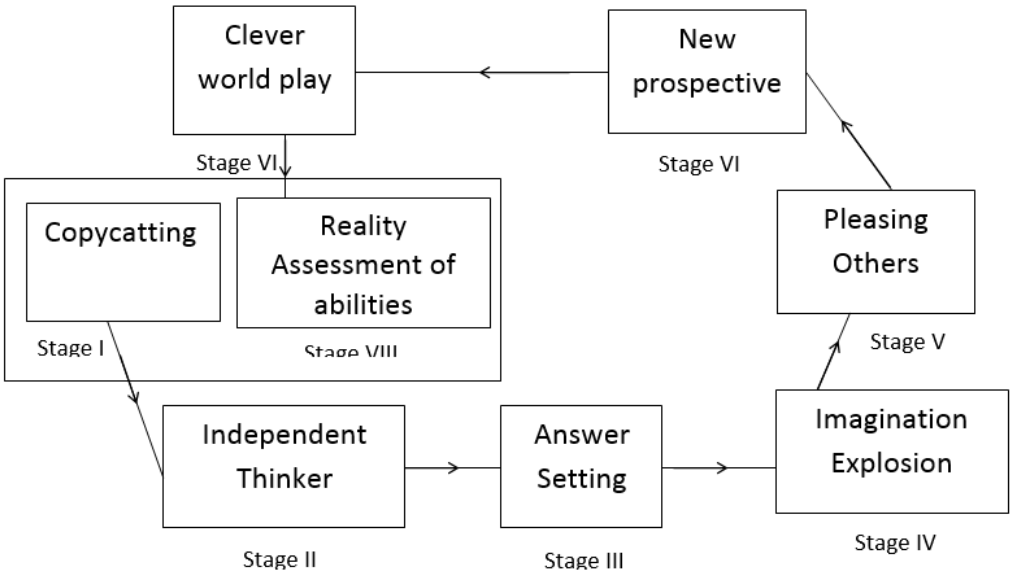


fig. II: Extracted from Pevzner, (2015) Age by age guide of child mental growth development.

The age by age guide that shows the developmental growth rate of a child as prepared by pevzner that was presented in cyclic chart in this study shows that in every one year there is a development in the brain of a child until the child grows into an adult as shown in figure II below.

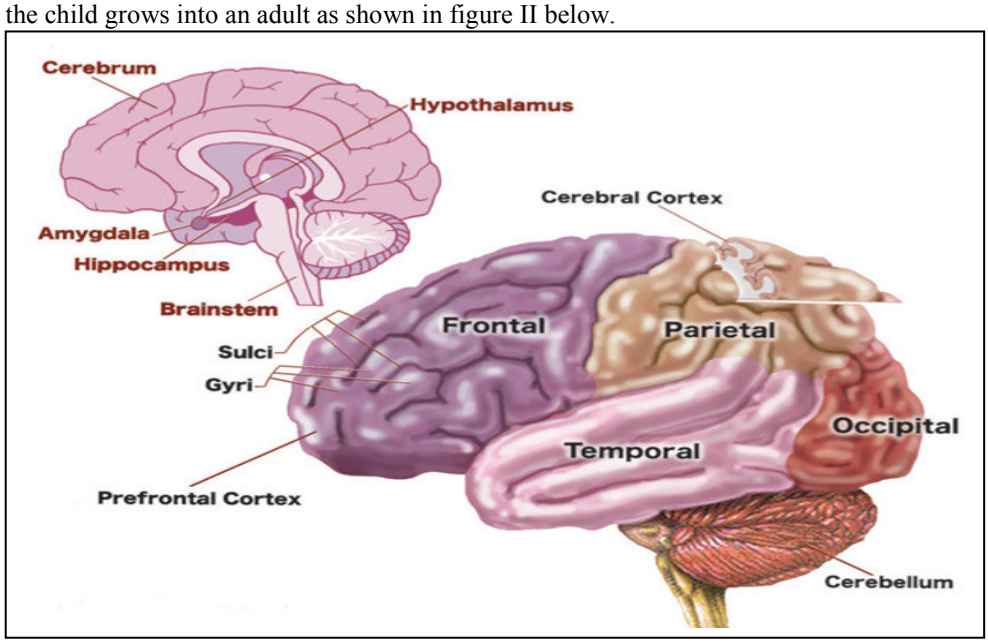


fig.III

2.0 Statement of the Problem

In the recent 21st century, it was observed that children from the elementary schools has demonstrated poor interest towards learning and ability to recall what has been taught to them in the classroom. These problems could be tied to teaching methods that is adopted by the teacher during teaching and learning process in the classroom. Also poverty could cause the problem of poor academic achievement and interest among children at the elementary school stage. Batter, (2015) states that study has shown that poverty affects the growth of children brain from poor background compared to the children from rich homes; this is because the brain cerebral cortex is often larger in children that are from rich homes. To support this statement Reardom, (2015) observed from study that children from low-income families have smaller brains and lower cognitive abilities at the elementary schools and also lack skills off being able to identify objects, because of the traditional teaching

method that is being used by teachers in the classroom.

To motivate a child interest and academic achievement, this research tends to expose children to a learning process by using teaching aids as pedagogy tool in the school system to develop the brain of children which is the purpose of the study.

3.0 Research Questions

Two research questions were raised to guide the study:

1. What will be the effect of teaching aids as a pedagogy tool on children interest at the elementary school stage?
2. What will be the effect of teaching aids as a pedagogy tool on children academic achievement at the elementary school stage?

4.0 Hypotheses

Two null hypotheses were formulated and tested at 0.05 significant levels.

1. There is no significant difference between the use of teaching aids as a pedagogy tool in the classroom and children interest at the elementary school stage.
2. There is no significant difference between the use of teaching aids as a pedagogy tool in the classroom and children academic achievement in the elementary school stage.

5.0 Methodology

5.1 Design of the Study

The design of the study is quasi-experimental, this design was used in the study because the researcher intends to use intact class group that is randomized, to get a valuable data. Campbell and Stanley, (1963) established that quasi-experimental design give room for the collection of accurate data.

5.2 Population of the Study

The population of the study comprise of all the elementary school children between the ages of 5 – 6years in Nigeria elementary schools that was used for the study.

5.3 Sample and Sampling Techniques

The simple random sampling technique was used to select ten elementary schools from among all the elementary schools in Delta State Nigeria, where the research was carried out. Delta State has twenty five (25) local government areas. The ten schools are selected each from one local government area having an intact class group of children between the ages of 5 - 6yrs. Each of the class has a population of forty (40) children in a class making the total subjects for the study to be four hundred (400) children.

5.4 Instrumentation

The researcher designed two instruments titled Interest Inventory Test (IIT) to measure the children interest and Academic Achievement Test (AAT) to measure the children academic achievement level in the test. The two instruments contain ten (10) items each, which was administered to the children in their different schools for the purpose of data collection.

5.5 Reliability of the Instrument

The two instruments that was designed for the study were given face content validity by three experts, who are senior professors in the three universities namely; University of Nigeria Nsukka in Enugu state, Delta State University Abraka in Delta state and University of Benin in Edo state. The validate are from faculty of Education, one from the department of Measurement and Evaluation and the other two from the department of Nursery and Primary Foundation for useful criticism. The researcher pilot tested the two instruments using fifty (50) children in different elementary schools that were not part of the population of the study.

Data collected were analysed using Cronbach Alpha formula to calculate the reliability of the Interest Inventory Test, the reliability (r) was 0.71. While the data collected on the instrument titled Academic Achievement Test was analysed using theKuder-Richardson formula 20, the reliability (r) was 0.79. The two reliability value of the two instruments shows that the two instruments can measure what it is expected to measure.

5.6 Experimental Procedure

The ten (10) elementary schools used in the study were grouped into two groups X and Y. The group X contains five schools that were used as Control group, while group Y contains another five schools that was used as Experimental group. Both groups were exposed to two different teaching methods, the group X which is the

Control group was taught for a period of one week in each of the schools, without the use of teaching aids. While group Y that was Experimental group was taught for another period of one week in each of the five schools using teaching aids.

Elementary Schools used as Control Group X

S/N	NAMES OF SCHOOLS	LOCAL GOVERNMENT AREA	NO. OF SUBJECTS
1	Delta State University Nursery and Primary School, Abraka	Ethiope	40
2	Queen of our Lady Nursery and Primary School, Obiaruku	Ukwani	40
3	St. John Nursery and Primary School,Sapele	Sapele	40
4	Adanokpe Nursery and Primary School, Orerokpe	Okpe	40
5	Alegbon Nursery and Primary School, Effurun	Uvwie	40
	Total		200

Elementary Schools Used as Experimental Group Y

S/N	NAMES OF SCHOOLS	LOCAL GOVERNMENT AREA	NO. OF SUBJECTS
1	Agbor College of Education Nursery and Primary School, Agbor	Ika	40
2	Cavagina Nursery and Primary School, Warri	Warri South	40
3	Standford Academy Nursery and Primary School, Asaba	Oshimili	40
4	Ozoro Polytechnic Nursery and Primary School, Ozoro	Isoko South	40
5	Otowodo Nursery and Primary School, Ughelli	Ughelli South	40
	Total		200

6.0 Administration of the Instrument

The two instruments were administered to the subjects with the assistance of the class teacher who assisted the researcher to administer the two questionnaires separately at different periods. First the two instruments were pre-tested before the teaching of the two groups X and Y. After the teaching of the two groups using the two methods, both groups X and Y were post-tested to check for the level of interest and academic achievement of the children used for the study.

7.0 Duration of the Study

The total period spent in carrying out this study was three (3) months. One week each was spent in the teaching of the children in their different schools after the pre-testexercise by the researcher. After the teaching exercises, the researcher post-tested the children for another two weeks.

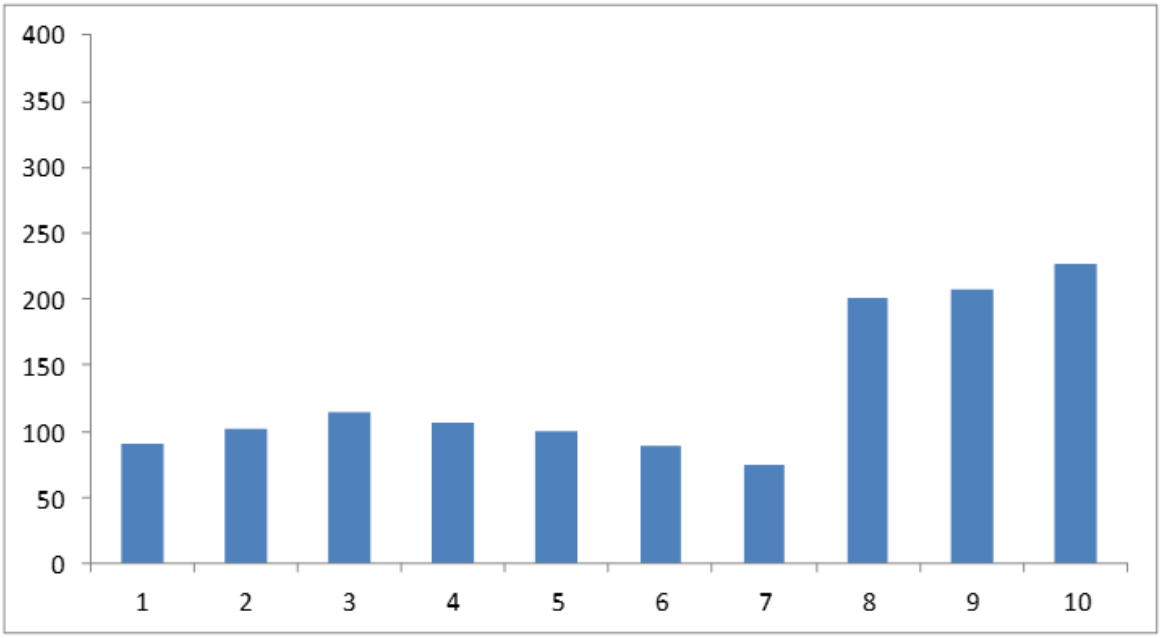
8.0 Method of Data Collection

The two questionnaires that were administered to the children in the different schools that were used in the study were retrieved back from the respondents by the researcher through the assistance of the class teachers that were used when the researcher administered the two instruments to the children. After the retrieval of all the questionnaires from the respondents, data were collected accordingly for the purpose of analysis.

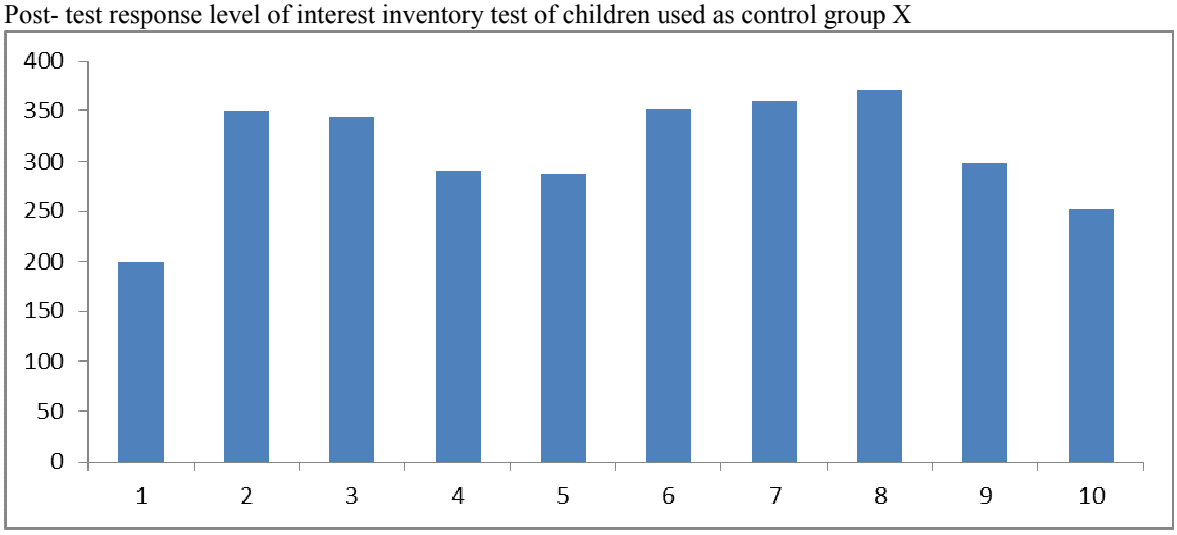
Table 1: Data collected from Interest Inventory Test when children were pre-tested and post-tested in group x and y.

Number of Items	Control Group X		Experimental Group Y	
	Pre-test	Post-test	Pre-test	Pro-test
1	50	90	49	200
2	109	102	78	350
3	61	115	105	343
4	68	106	121	290
5	100	100	120	287
6	79	89	68	351
7	105	75	119	360
8	112	201	53	370
9	78	208	94	298
10	45	226	75	251

Bar chartgraph representation of respondents in the control group X and experimental group Y after post-testing of Interest Inventory Test.



Post- test response level of interest inventory test of children used as control group X



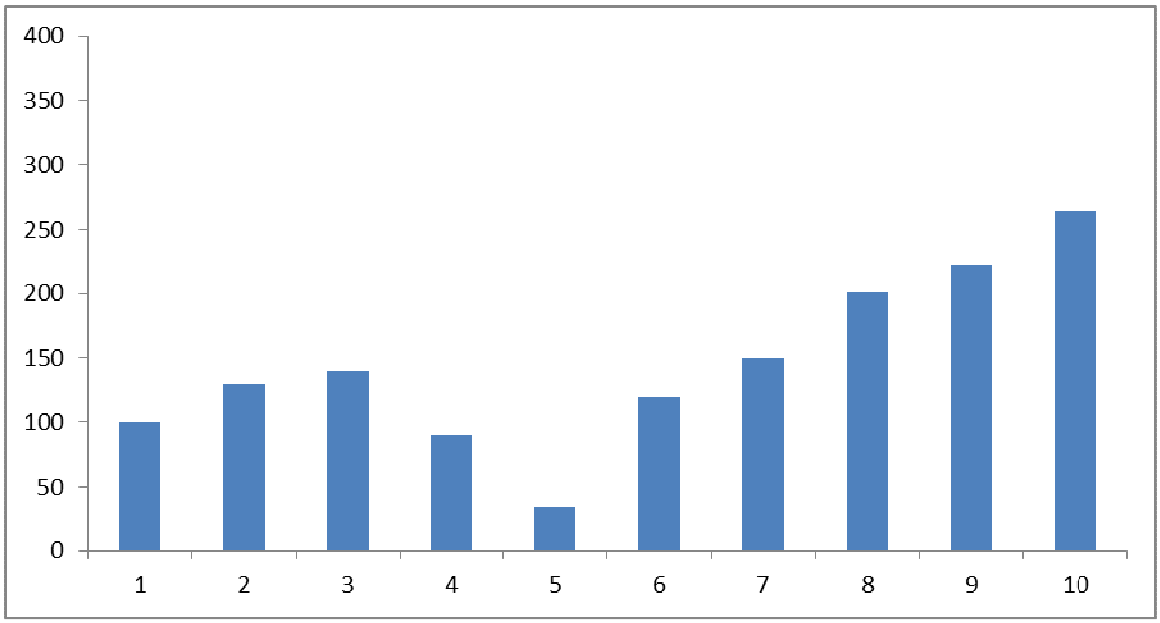
Post-test response level of interest inventory test of children used as experimental Group Y

From the two bar chart graph shown above, it is clearly demonstrated that the interest of the children improved after teaching them, using teaching aids on the experimental group Y on the bar chart graph. When compared to the level of interest of children on the control group X as shown on the bar chart graph.

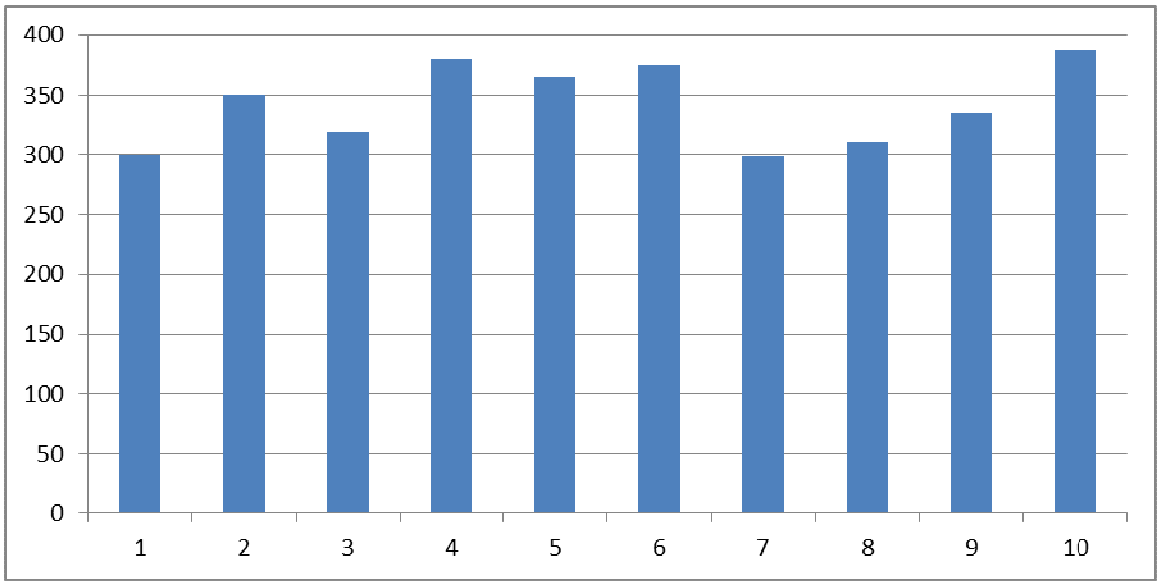
Data Collected from Academic Achievement Test when children were pre-tested and post-tested in group X and Y.

Number of Items	Control Group X		Experimental Group Y	
	Pre-test	Post-test	Pre-test	Pro-test
1	89	100	60	300
2	40	130	80	350
3	60	140	120	320
4	101	90	70	380
5	190	34	89	365
6	30	120	30	375
7	35	150	42	299
8	45	201	87	310
9	60	222	38	336
10	80	263	60	387

Bar chart graph representation of the response of respondents in the control group X and experimental group Y after post- testing of Academic Achievement Test.



Post- test response level of academic achievement test of children used as control group X



Post-test response level of academic achievement test of children used as experimental group Y

From the two bar chart graphs shown above it is clearly demonstrated that the academic achievement of the children improved after teaching them using teaching aids on the graph. When compared to the level of academic achievement of children on the control group X as shown on the bar chart graph.

9.0 Data Analysis

The data collected were analysed using descriptive statistics to compare the mean and standard deviation of control group and experimental group to provide answer for the two research questions, while analysis of Covariance (ANCOVA) was used to test the two stated hypotheses to check for level of significance at 0.05 significant levels.

Research Question 1

What will be the effect of teaching aids asa pedagogy tool on children interest at the elementary school stage?

Data collected for the interest inventory test instrument as shown in table I was used for the analysis.

Table III: Descriptive Statistics

Dependent Variable Interest

Control = I	Experimental = 2	Mean	Std. Deviation	N
1		131.2000	56.87960	10
2		310.0000	54.89789	10
Total		220.6000	106.64471	20

From the analysis in table III shown above the mean value of the experimental group 310.0000 is > greater than the control group value 131.2000. Also the Std. deviation of the experimental group value 54.89789 is < lesser than control group value 56.87960. Therefore it can be observed that from the mean values of the Control group and experimental group there is a significant difference between the use of teaching aids to teach children and their interest.

Hypothesis I (H_{01})

There is no significant difference between the use of the teaching aids as a pedagogy tool in the classroom and children interest at the elementary school stage.

Table IV Tests of Between Subjects Effects

Dependent Variable Interest

Source	Type III sum of Squares	df	Mean Square	F	Sig.	Partial Eta squard
Corrected Model	159849.138[a]	2	79924.569	24.159	.000	.740
Intercept	76720.153	1	76720.153	23.191	.000	.577
Pre-test	1.938	1	1.938	.001	.981	.000
Post-test	156119.110	1	156119.110	47.191	.000	.735
Error	56239.662	17	3308.215			
Total	1189376.000	20				
Corrected Total	216088.800	19				

G.R squared = .740 (adjusted R squared = .709) df = 19

From the analysis of table IV shown above the calculated F-Value 47.191 is > greater than P-Value .000 as shown in the table. It therefore means that there is a significant difference between the use of teaching aids to teach children in elementary school level and the interest of children. Therefore the null hypothesis is rejected.

Research Question II

What will be the effect of teaching aids as a pedagogy tool on children academic achievement at the elementary school stage?

Data collected from the academic achievement test instrument as shown in table II was used for the analysis.

Table V: Descriptive Statistics

Dependent Variable Achievement

Control = 1 Experiment = 2	Mean	Std. Deviation	N
1	135.0000	75.46890	10
2	342.7000	33.76076	10
Total	238.8500	120.79006	20

From the table V shown above the mean value of experimental group 342.7000 is > greater than the control group value 135.0000. Also the standard deviation of the control group 75.46890 higher than the standard deviation of the experimental group 33.76076. Therefore it is observed that there is a significant difference between the control group and experimental group in terms of the use of teaching aids to teach children in elementary school level and their academic achievement.

Hypothesis II (HO_2)

There is no significant difference between the use of teaching aids as a pedagogy tool in the classroom and children academic achievement.

Tests of Between Subjects Effects

Table VI: Department Variable Achievement

Source	Type III sum of Squares	df	Mean Square	F	Sig.	Partial Eta squared
Connected Model	224014.623[a]	2	112007.311	35.712	.000	.808
Intercept	331975.162	1	331975.162	106.082	.000	.862
Pre-test	8318.173	1	8318.173	2.658	.121	.135
Post-test	208403.425	1	208403.425	66.595	.000	.797
Error	53199.927	17	3129.407			
Total	1418201.000	20				
Corrected Total	277214.550	19				

a. R Squared = .808 Adjusted R Squared = 786 df = 19

From the analysis of table VI shown above, the calculated F-value 66.595 is> greater than P-value .000

as shown on the table. It therefore means that there is a significant difference between the use of teaching aids to teach children in the elementary school level and academic achievement of children. Therefore the null hypothesis is rejected.

10.0 Discussion of Findings

The following findings were observed in the study by the researcher:

1. The mean response of the children in the experimental group is greater than the mean response of the children used as control group in the study.
2. The children interest was increased when they were post-tested after the teaching of the children using teaching aids.
3. The children's level of academic achievement was high when they were post-tested after teaching the children using teaching aids
4. The teaching aids used in the experiment group helped to enhance children performance when they were post- tested using the Interest Inventory Test and academic achievement test instruments.
5. The post-test from the two bar charts graphshows the level of children interest and academic achievement is higher compared to the post-test of the control group.
6. The calculated F-value is far higher than the P-value, making the two null hypotheses to be rejected.
7. The children were able to demonstrate good listening attention when the teacher used the teaching aids to teach the experimental group.

11.0 Recommendations

Based on the findings observed by the researcher in the study, the following recommendations are made:

1. The federal government, ministry of education and curriculum planners should enforce the use of teaching aids in the elementary school level curriculum, to enhance brain development of a child.
2. Teachers should make use of teaching aids to encourage and motivate children interest in school system, during teaching and learning process.
3. Children should be exposed to the use of toys by parents during playing process as teaching aids to develop their brain before entering elementary schools.
4. Parents should feed children with high nutrient foods that will help to develop and support their brain development.
5. Children should be granted freedom to make use of teaching aids in their private learning period example use of computer, software to help recall what has been taught to them by the teacher in the classroom.
6. The use of teaching aids by the teacher should be made compulsory by school management and heads to enhance the level of thinking in children at the elementary school stage.
7. Parents should introduce their children to the use of teaching aids as a means of enhancing their understanding to complement and support the teachers work at school when children are taught by parents.

12.0 Conclusion

The use of teaching aids as a pedagogy tool has enhanced children level of thinking and development of their brain, motivation of interest and their level of academic achievement from the two instruments that was used in the study. Hence from this study the researcher is recommending strongly to teachers, parents, children and the government that teaching aids should be made a vital tool that must be used by the teachers and children to improve good knowledge and skills for future child brain development, interest, and academic achievement to enhance future technology and development of many nations globally.

13.0 References

Better, M. (2015)Poverty, May Affect the Growth of Science. Retrieved from news.sciencemage.org/brain. behaviour on 15th June, 2015

Britto, P. (2014) How children brain develop- new insights. UNICEF Connect. Retrieved from UNICEF BLOG.htm on the 13th of May 2015

Campbell,D.T. and Stanley J.C. (1963) Experimental and Quasi-experimental design for Research. Houghton Mifflin Company, Boston, Dattas Geneva, Ill, Hopewell, N.J. Palo Alto London, P.34.

Cox, J. (2015) What is the Role of a Teacher? Elementary Education. About.com. Retrieved from What is the Role of a Teacher.htm on 16th January, 2015.

Diamond, M. &Hoppson J.C. (1998). Magic trees of the Mbindi. How to Nurture your child intelligent. Creativity and healthy emotions from birth through adolescence. New York Dutton.

Douglas,B.H. (2001) Teaching by Principle. An Interactive Approach to language pedagogy. (2nd Ed.) White

Plains, NY: Longman.
Donmyei, Z &Murphey, T. (2003). Group dynamic in the language classroom, Cambridge: Cambridge University Press.
Dunn, J. (2011). The Evolution of Classroom Technology. Edudemic connecting education and technology. Retrieved from www.edudemic.amclassroom technology on the 18th April, 2015.
Edison, T. (1913). Books will soon be obsolete in the schools. Quote Investigator published in the New York Dramatic Mirror (NDIE).
Fischer, K.W. & Rose, S.P (1998). Growth Cycles of Brain and Mind Educational Leadership, 56(3) pp56-60.
Harmer, J. (2007), The practice of English Language Teaching (3rd Ed.) Longman. www.longman.com.
Jeppson, J & Myers J.A. (2006). Brain Development. Providing parent partnership.Retrievedfromhttp//www.entension.pursue.edu/providingparent/childgrowth.development/ braindev.htm. on the 2nd March, 2015.
Krueger, A. (2005) 7 Brain Foods for Kids. ADHD in children Health Center. Retrieved from Brain Foods for kids.htm on the 9th March, 2015.
Lanper, J.T. (1997), Redefining the Role of the Teacher; It's a Multifaceted profession. Retrieved from Redefining the Role of the Teacher it's a multifaceted profession – Edutopia.htm on 18th June, 2015.
Leonidas, L. (2015), Stimulating A Baby 5 Brain. Brainy Child. Retrieved from www.brainy.child.com. Larticle/stmlbrain.shtml on 28th June, 2015.
Mcleod, S. (2004) Jean Piaget Developmental Psychology. Simple psychology. Org/piaget.html on the 7th November, 2014.
Sahakor, R. (2014), 2 Pros and 2 Cons To Education Technology. Edudemic connecting education and technology. Retrieved from 2 pros and 2 cons to Education Technology – Edudemic.htm on 6th July, 2014.
Pevzner, H. (2015) Age age by guide to child mental growth. Brain Development in Children. Retrieved on the 3rd January, 2015 from Brain in Children parenting htm.
Reardon, S. (2015) Poverty shrinks brain from birth nature. International weekly Journal of Science. Retrieved 4th May, 2015 from www.nature.complanews/poverty. Shrinks.brains.
Veira, I. (2015) Role of Teachers in the 21st Century. The language net vol.10. Retrieved on the 20th June, 2015 from classroom link Role of Teachers in the 21st century.htm.